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TECHNICAL SERVICES

The cable lay pitch was set by a capstan take-up speed relative to the rotations speed to be nominally 1.03 inch. After cabling, the material was heat treated at 760 C for 2 hr. in 0.1 atm of oxygen. The cable was then rolled to at thickness of 0.0157 inch and heat treated for 6 hr. at 827 C in 7.5 % oxygen in nitrogen atmosphere. The cable was finally turks head rolled to 0.0126 inch in thickness. A final heat treatment of 40 hr. at 827 C, 30 hr. at 808 C, and 30 hr. at 748 C, all in 0.075 atm of oxygen in nitrogen was employed. The J_c at 77K ($B=0$) was 2996 A/cm² at a fill factor of nominally 25 % superconductor cross section. The voltage/current characteristics of the sample in 0 magnetic field are shown in Exhibit 1.

EXAMPLE 2

A 91 filament composite was made with an approximately a hexagonal array filament pattern as described in Example 1 above. In this example, the multifilament composite was further drawn to nominally 0.028 inch diameter and turk-headed or drawn through a square die to 0.0245 inch on a side. The square cross section composite was annealed in air at 300C for nominally 10 minutes. The material was divided approximately equally into 8 parts and each was layer wound onto a cabling spool.

An 8 strand Rutherford cable is made from 91 filament composite strand. A "ferris wheel" cabling configuration is used, where the spools' orientation in space is fixed as it rotates around the axis of the cabler, similar to a seat on a ferris wheel. The tension on each strand is controlled by magnetic breaks and set to nominally 0.5 inch-pounds. The width and thickness of the cable were set by a non-powered turks-head to be 0.096 and 0.048 inch, respectively. The strands enter the turks-head with the sides of the square cross section maintained parallel to the sides of the resulting rectangular cable. The cable lay pitch is set by a capstan take-up speed relative to the rotations speed to be nominally 1.03 inch. After cabling, the material is heat treated at 760 C for 2 hr. in 0.1 atm of oxygen. The cable is then rolled to at thickness of 0.0157 inch in a single pass. The cable is then heat treated for 6 hr. at 827 C in 7.5 % oxygen in nitrogen atmosphere. The cable is finally rolled to 0.0145 inch in thickness in a single pass. A final heat treatment of 40 hr. at 827 C, 30 hr. at 808 C, and 30 hr. at 748 C, all in 0.075 atm of oxygen in nitrogen is employed. The J_c at 77K ($B=0$) is 2280 A/cm² at a fill factor of nominally 20 % superconductor cross section.

The various features and advantages of the invention may be seen from the foregoing description and examples. Iterative variations on the processes described above, such as changes in the materials, the number and type of texturing steps, and the

cabling styles and equipment used will be seen to be within the scope of the invention. Many modifications and variations in the preferred embodiments illustrated will undoubtedly occur to those versed in the art, as will various other features and advantages not specifically enumerated, all of which may be achieved without departing from the spirit and scope of the invention as defined by the following claims.

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